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VULCAN CHEMICALS DIVISION
VULCAN MATERIALS COMPANY
WICHITA, KANSAS

PRELIMINARY

SWMU ASSESSMENT
WORK PLAN

DRAFT

PROJECT #540-8
JULY 1990

EDER ASSOCIATES
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Locust Valley, New York
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PERMITS SECTION

July 11, 1990

Mr. Wes Bartley
Environmental Protection Agency
RCRA Branch Permits Section
726 Minnesota Avenue
Kansas City, Kansas 66101

Dear Mr. Bartley:

Please find enclosed a copy of the preliminary draft of the SWMU Assessment Plan. This document details the work that is needed for the assessment of the SWMU located on the Vulcan Chemicals plant site.

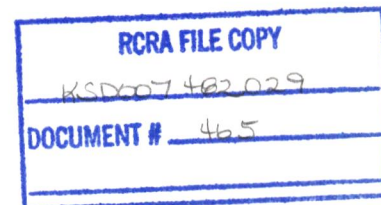
If you have any questions, please call me at (316) 529-7560.

Sincerely,

A handwritten signature in cursive script that reads "Tom Golden".

Tom Golden
Environmental Engineer

ljs
Enclosure
c: John Ramsey, KDHE



11 JUL 90

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1.0 OBJECTIVES

Vulcan Chemicals is required by the HSWA portion of its RCRA permit to submit a plan to assess potential releases from its Solid Waste Management Units (SWMU). This plan contains the methods to be used during the SWMU assessment. Vulcan has seventy-nine (79) SWMU to be investigated during the RFI. These units include landfills, solar ponds, hazardous waste storage areas and wastewater handling sumps. Table C-1 and C-2 in the RFI Workplan lists the SWMUs to be investigated (copies attached).

The objective of the SWMU Assessment Workplan is to screen for constituents of concern found in Vulcan's waste stream. This screening process will use various analytical techniques to provide an indication of whether contamination exists around these units. If contamination is present these units will be further investigated.

The "Assessment of SWMUs Decision Diagram" (Figure 1) will be used to determine which units need further investigation. Using this figure, the data gathered during the initial assessment will be reviewed to determine which units might be releasing into the environment.

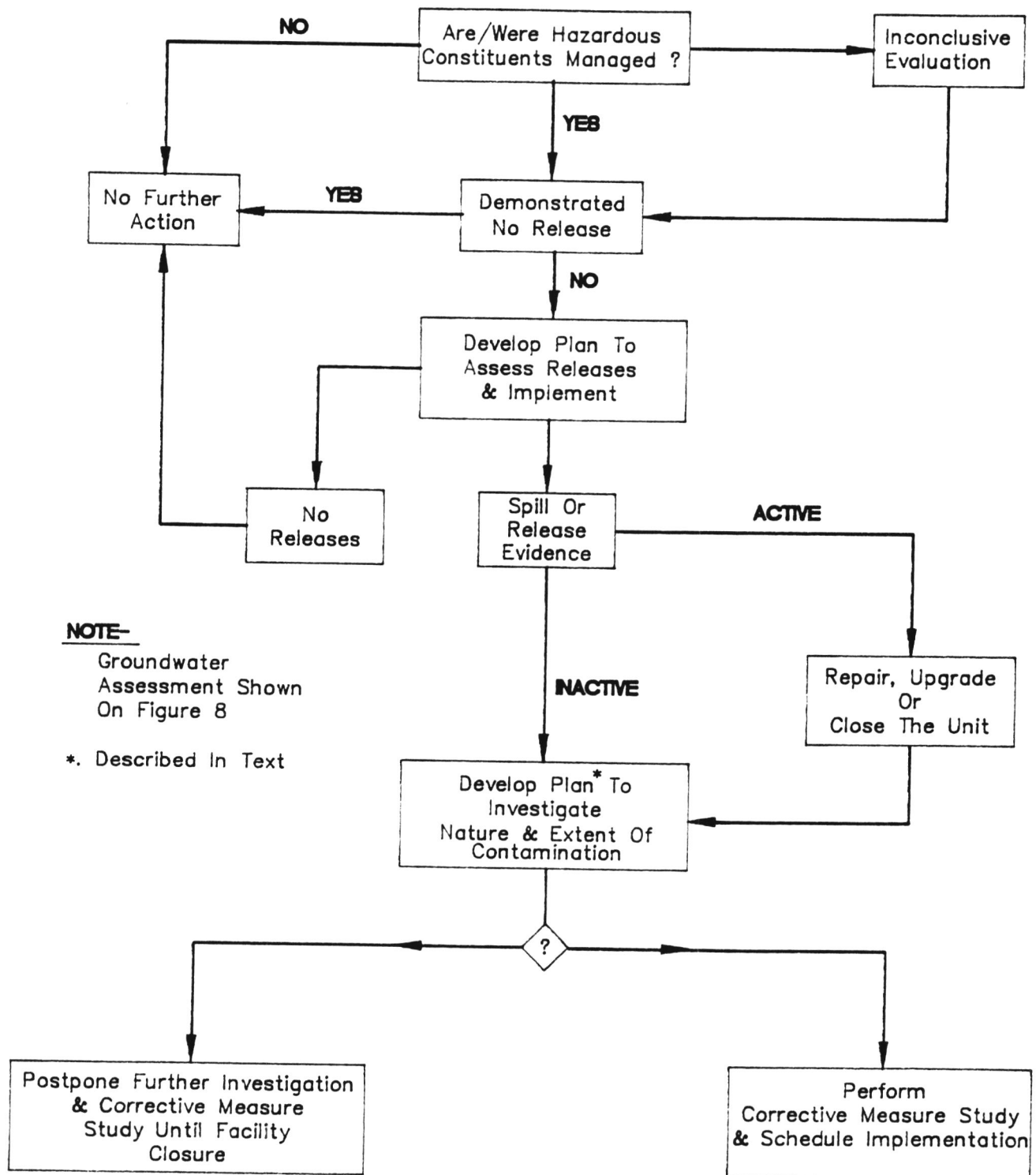
Units found to have contamination will be candidates for further investigation. Background sample analytical results, unit location (with respect to production areas), nature and magnitude of contamination and health risk data will be used in this additional assessment. Alternate methods may also be used in determining the areal extent of the contamination.

Different units may require different cut-off limits. For example, the limits for the storm water ponds would be different from

the units in the plant site. The plant site units may need higher limits due to possible contamination from production units.

Another factor to consider for further work would be an evaluation of the potential of a unit for continued release. Units capped with concrete would only have the contamination confirmed. The possibility of the contamination infiltrating into the groundwater is greatly reduced by the cap.

The decision diagram for assessment of SWMUs is included as Figure 1.



ASSESSMENT OF SWMUs DECISION DIAGRAM

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WICHITA, KANSAS

2.0 SWMUs TO BE INVESTIGATED

Table 1 identifies the SWMUs which will be investigated during the assessment. Figure 2 depicts the location of the majority of these units.

Four SWMUs will not be investigated as part of this assessment plan. These units either have been previously investigated, had an approved RCRA closure, did not handle hazardous constituents, or will have their investigation postponed. The four units are LP-2, the alpha cake landfill, underground piping and the interceptor well system. LP-2 and the alpha cake landfill had their investigations or closures performed during the mid-1980's. The underground piping that handled material that contained hazardous constituents is no longer in service. Investigation of the interceptor well system will be withheld until the associated underground piping is raised aboveground. *

LP-2 had RCRA closure performed during the Spring of 1984. Sampling results are included with the closure certification. The chromium levels were well below the EP toxicity levels as defined by 40 CFR 261.24 therefore there is no need to investigate this unit. *

The alpha cake landfill was investigated in the fall of 1987. Borings were taken around the landfill to determine if releases were occurring. Soils and groundwater sampling was performed to determine the amount and extent of any contamination. Air sampling was done to determine if there were any releases to the atmosphere. A report dated March 1988 written by Canonie Environmental has been submitted to EPA. The investigation of the alpha cake landfill is enough to proceed with the evaluation of corrective measure techniques.

The Canonie report recommends an investigation of the groundwater quality of the S-4 sand zone. A geophysical survey of the S-4 sand zone to the south and southwest of the landfill was completed in the

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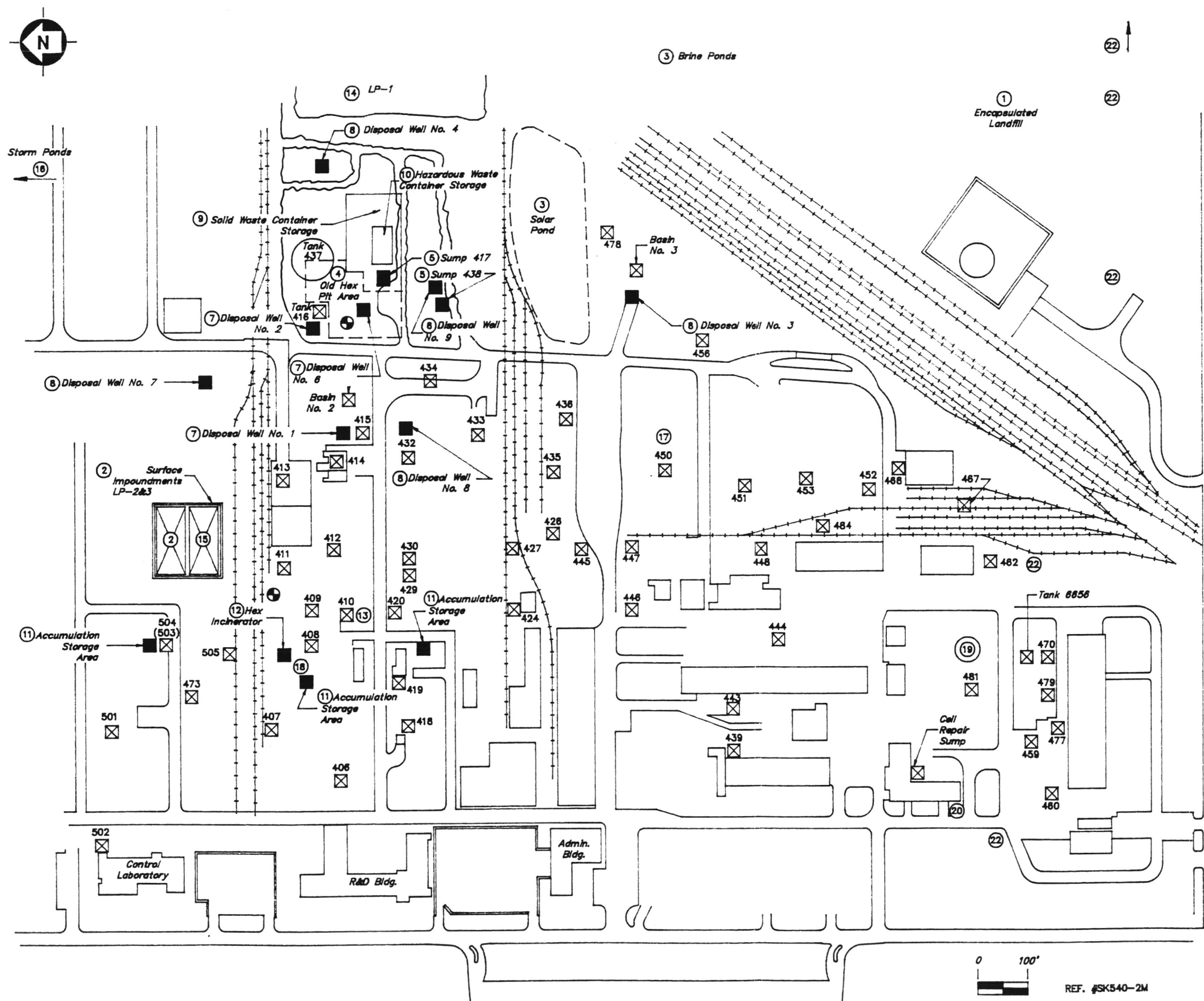
Table 1

SWMUs TO BE INVESTIGATED

Units	---SOIL VAPOR SAMPLING---				pH	Asbestos
	Chromium	Method 3810	Volatiles	Direct Analysis		
406	1		1		1	
407			1		1	
408	1	1	1		1	
409	1		1		1	
410			1		1	
411			1		1	
412		1	1		1	
413			1		1	
414			1		1	
415			1		1	
420			1		1	
424		1	1		1	
426		1	1		1	
427		1	1		1	
429			1		1	
430			1		1	
432	1		1		1	
433			1		1	
434			1		1	
435					1	
436			1		1	
439					1	
444	1				1	
445					1	
446					1	
447					1	
448					1	
450					1	
451					1	
452					1	
456					1	
459					1	
460					1	
467					1	
470					1	
473			1		1	
477					1	
478					1	
479					1	
481					1	
484					1	
501			1		1	
502			1		1	
503			1		1	
504			1		1	
505			1		1	
Basin 2	1	1	1		1	
Basin 3	1	1	1		1	
Cell Repair Sump					1	1
Tank 416	1	1			1	
Tank 437	1	1			1	

eder associates consulting engineers, p.c.

Units	—SOIL VAPOR SAMPLING—					pH	Asbestos
	Chromium	Method 3810	Volatiles	Direct Analysis			
Tank 6656						1	
LP-1	1					1	
LP-3		1				1	
Brine Pond	1	1				1	1
Solar Pond	1	1				1	1
Old Hex Pits				2		1	
N Drainage	4/1	4				1	
Ditch							
Middle Drainage	4/1	4				1	
Ditch							
S. Drainage	4/1	4				1	
Ditch							
Inactive Disposal			1				
Wells (4)							
Active Disposal			1				
Wells							
Solid Waste Storage			1				
Hazardous Waste			1				
Storage							
AS: Penta		1	1				
Chloromethanes 1			1				
Chloromethanes 2			1				
PCE Plant			1				
Instrument Shop			1				
Hex Incinerator		1					
Air Stripper			1				
Storm Water Ponds	1	1	1	1		1	6
D-2 Brine Sludge						1	
Asbestos Surface			1			1	4
Impoundments							
Waste Asbestos			1			1	
Handling							



- LEGEND**
- ⊙ SWMU (Table C-1)
 - ⊠ WASTEWATER HANDLING SYSTEM UNIT WITH I.D. (Table C-2)
 - ⊕ PROPOSED MONITORING WELL NEST

**LOCATION OF SWMU's AND
WASTE HANDLING SYSTEM UNITS**
VULCAN MATERIALS, INC.
WICHITA, KANSAS

REF. #SK540-2M

Spring of 1990. The area east of the landfill will be investigated in conjunction with the Phase II fieldwork.

Research on the underground piping revealed that only the potable and process water and sewage piping were placed underground. This was done for freeze protection. The process water piping ran underground from the treatment facilities to the production areas. All wastewater and product piping was placed on pipe racks above ground. The low freezing point of products and wastewater (sufficiently high product concentration) prevented freezing. The investigation of previously abandoned underground piping will be conducted at plant closure.

The concern for potential contamination from the interceptor well system would be a release from its piping to the disposal system. A leak from the pumping string of an interceptor well would enter the contaminated aquifer which is being remediated by pumping. The piping from withdrawal pumps to disposal header is currently underground and is to be replaced by above ground piping in the near future. It is recommended that the investigation of the underground piping be delayed until this work is underway. Pressure testing is proposed for the piping from the interceptor well system. If the piping passes, no investigation will be performed. If any piping fails the test, an assessment will be proposed at a later date. *

3.0 WASTE CONSTITUENTS ASSOCIATED WITH THE SWMUs

All SWMUs to be included in the investigation were evaluated for Appendix VIII constituents that could have potentially been released to soil or groundwater. This evaluation resulted in the identification of the following potential contaminants, grouped by categories.

3.1 Chromium

Chromium is present as a result of its use in cooling towers and in the hex waste scrubbing tower waters, and in the hex waste due to corrosion of stainless steel piping. The incinerator scrubbing system removes the entrained chromium to the wastewater disposal system.

3.2 Acids/Alkalines

Contamination from caustic and acid may be present near, and associated with, the wastewater sump system. Spills and leaks from these units resulted in high or low soil pH.

3.3 Organics

All production of organic materials occurs in the north area of the plant. The primary constituents of concern are methyl chloride, methylene chloride, chloroform, carbon tetrachloride, tetrachloroethylene and chlorinated phenols. Hexachlorocyclohexane (HCCH) and its isomers were once produced on the plant site. Hexachlorobenzene (HCB), hexachloroethane (HCE), and hexachlorobutadiene (HCBD) are produced as a by-product of the manufacturing of tetrachloroethylene.

These parameters are major products of manufacture of the plant.

3.4 Asbestos

Asbestos is a potential contaminant in areas of the plant which are or have been associated with chlorine cell rebuilding. Asbestos will be investigated at sumps where asbestos would be expected to be found and in the asbestos surface impoundment.

4.0 SAMPLING/ANALYSIS PROTOCOL

Table 1 identifies the analyte(s) to be investigated at each SWMU. The following procedures will be used for the analyte categories in the table.

4.1 Sampling and Analysis for Chromium

SWMUs to be investigated for releases of chromium contamination will be divided into two categories based on the anticipated depth of contamination, if present. The sump system handling wastewater will be investigated for shallow contamination. Impoundments that may have handled wastewater from cooling towers will be investigated for shallow and deep contamination. Soil samples will be collected at 0-6 inch depth and submitted for analysis. Compositing will be performed using a glass mixing bowl and stainless steel spoon at units indicated in Table 1.

4.1.1 Shallow/Deep Contamination Assessment

The SWMUs that fall into this category are the following:

- Brine Ponds
- Solar Ponds
- Asbestos Surface Impoundments

These units would be sampled by using hollow stem augering methods to obtain split spoon samples on 2 foot centers from 10 feet to 16 feet below grade at two locations, or, if fill and native soil can be distinguished, samples will be collected from the ten foot interval beginning at the top of the native soil. These ponds have been filled to an approximate depth of 10 feet and samples from the 10-15 foot zone should characterize previous releases where native soil and fill cannot be distinguished. The samples from each borehole will be composited, and the resultant samples will be shipped to a laboratory for analysis. The drill rig, auger flights, sampling equipment and

tools will be decontaminated in accordance with procedures in Section 4.5 of the RFI QA/QC Plan.

4.1.2 Shallow Contamination Assessment

The SWMU units that will have surface samples taken for metals analysis are:

- North Drainage Ditch
- Central Drainage Ditch
- South Drainage Ditch
- Storm Water Ponds
- Sump 406
- Sump 408
- Sump 409
- Sump 432
- Sump 444
- Basin 2
- Basin 3
- Tank 416
- Tank 437

Sampling locations for this list of SWMUs will be as described except in the case of the north, central, and south drainage ditches and the stormwater ponds. A sample will be collected on the north, south, east and west side of each unit. Each sample will be taken six inches away from the wall of the unit from zero to six inches depth.

Four samples will be collected from each drainage ditch. Samples will be collected at equidistant spacings along each ditch. The sampling and compositing procedures will be the same as for other samples to be analyzed for chromium.

The sampling area for the stormwater ponds will be split into two sections by the existing berm. The two areas will be split into a total of four equal parts. Samples will be taken in each area and

composited to create one sample from each pond. The two soil samples will be submitted for analysis.

4.2 Sampling and Analysis for Acid/Alkaline Impact

Areas where acidic or alkaline wastewaters may have been released to the environment will be investigated using soil pH determination. Soil samples will be taken from every SWMU listed in the RFI workplan and analyzed in the field for pH using a distilled water extract analyzed by a Hester type pH meter. The procedure will be in accordance with Section 9.6.5.2.5 from "A Compendium of Superfund Field Methods," USEPA (1540/P-87/001), December, 1987.

Samples will be collected and analyzed at locations where samples for other analytes are collected, or, six inches from the unit and from 0-6 inches depth on the north side. If a concrete pad exists around a unit, a hole will be drilled through the concrete to access the sampling area.

4.3 Sampling and Analysis for Organic Constituents

Direct soil analysis will be performed at the hex pits on the plant site. Soil vapor analysis will be used for the other units identified in Table 1. Soil vapor analysis will include volatile organic analysis, and for some units, semi- and non-volatile organic analysis (Method 3810).

4.3.1 Direct Soil Analysis

Two borings will be drilled in the 20'x15' hex pit area. Samples will be taken on two foot centers from 10-16 feet depth. Soil samples will be screened for VOCs as described in Section 4.3.2 and the sample with the highest reading submitted for analysis. Auger flights, tools, and sampling equipment and drill rig will be decontaminated as described in the RFI QA/QC plan.

Four samples will be collected from the storm water ponds at locations where the samples for metals analysis will be collected.

4.3.2 Soil Vapor Screening

Soil vapor screening will be accomplished using a portable gas chromatograph (PGC) for volatile organics, and the Vulcan Chemicals Division, Wichita, Kansas, Environmental Laboratory for semi-volatile and phenols analysis.

4.3.2.1 Volatile Organics Soil Vapor Screening

Attachment A describes the soil vapor sampling procedure. Attachment B describes the screening procedure for volatile organic constituents of interest. The split spoon samples will be taken as described in the RFI QA/QC plan. The drill rig and auger flights will be decontaminated as described by the RFI QA/QC plan.

The brine and solar ponds will be sampled using hollow stem augers and split spoon sampling as described in Section 4.1.1. The samples will be halved lengthwise, and one portion head space screened using a flame ionization detector, and the other portion composited for metals analysis.

Soil vapor samples will be collected from the storm water ponds, LP-3 and the sumps for VOC PGC screening. Soil vapor samples will be collected from four locations around LP-3, on the north, south, east and west side, six inches from the synthetic liner.

One sample will be collected at each of the remaining units. Plant personnel will drill a hole in the concrete pad where necessary for sample acquisition. Samples will be collected where stained soil is present. If no stained soil is present, the sample will be collected on the north side of the unit.

4.3.2.2 Soil Screening for Semi and Non-Volatile
Organic Soil Screening

Samples for semi- and non-volatile organic soil screening will be taken to Vulcan's Environmental Laboratory for analysis. This analysis will be performed as described in Attachment C (Method 3810 for Headspace Analysis).

4.4 Asbestos

The RFI QA/QC Plan will be used for the asbestos sampling and compositing procedure. Sampling will occur at the locations of the brine, solar, and storm water ponds.

Two soil borings will be drilled in the asbestos surface impoundment. Samples will be taken on two foot centers from 10 to 16 feet below grade (original bottom), composited, and submitted for lab analysis of asbestos fibers. If concrete overlies the unit, a hole large enough to take a sample will be made to accommodate the work.

The samples from waste asbestos handling and the cell repair sump will be taken six inches from the unit and from a depth of zero to six inches depth. The samples will be taken in the same location as the metal samples. These samples will also be composited. All asbestos samples will be sent to a contract laboratory for analysis.

ATTACHMENT A

SOIL VAPOR SAMPLING
PROCEDURE

Soil vapor samples will be collected in the following manner:

- (1) A hammer bar and 1/2" diameter steel rod will be utilized to make a 1/2" diameter vertical hole 3 to 4 feet into the soil. The bar has a slide hammer enabling the operator to pound the bar out once the desired depth has been reached.
- (2) Once the rod is removed, a stainless steel tube (6' by 1/4" OD by 1/8" ID) with a Teflon tube inside is inserted into the hole. Attached to the end of the Teflon tube is a large head nail with its point just fitting into the Teflon tube, and the head of the nail just large enough to cover the end of the stainless steel tube. This arrangement is then inserted into the hole, nail-end first to eliminate clogging of the open tube. When the tube has been inserted to maximum depth, the stainless steel tube is withdrawn 3" from the bottom of the hole and the nail released by pulling up and withdrawing the Teflon tube. An airtight seal will then be created around the tube at the surface with a laboratory grade stopper and compacted clayey soil to minimize infiltration of ambient air. A Teflon^(TM) tube is then attached to the stainless steel tube using an airtight brass bushing and Teflon fitting.
- (3) A 1 liter Tedlar air sampling bag with tube bar and shut-off valve which has previously been purged three times with ultra zero (UZ) air is connected using a Teflon fitting to the Teflon sampling tube within an NCP ASV-100 custom air sampling vessel. A vacuum is used to create a low pressure system within the air sampling vessel causing air to be drawn up directly through the stainless steel and Teflon sample tube and filling the Tedlar Bag with soil gas. The sample bag valve is closed, removed from vessel, marked with the following information:
 - i) Sample ID No.,
 - ii) Date, and
 - iii) time.

ATTACHMENT B

FIELD PORTABLE GAS CHROMATOGRAPHY
SCREENING OF SOIL VAPOR SAMPLES

Objective

Approximately 50 samples will be analyzed for:

1. chloromethane (methyl chloride)
2. dichloromethane (methylene chloride)
3. trichloromethane (chloroform)
4. tetrachloromethane (carbon tetrachloride)
5. tetrachloroethene (PCE)

Methodology

Initial Screening

Soil gas samples will be collected in Tedlar gas sampling bags and then screened with either a Photovac Microtip or TIP II. Screening will permit rough estimation of instrument gain and sample volume to be used when analyzing samples on a Photovac 10S50 Portable Gas Chromatograph (PGC) as follows:

<u>TIP Reading (ppm)</u>	<u>Gain Setting</u>	<u>Injection Size (ul)</u>
1-50	500	100
50-100	100	100
100-250	20	100
250-500	5	100
>500	2	50

These initial parameters may be adjusted according to instrument sensitivity to the compounds of interest, and if necessary syringe dilutions may be made for samples with very high TIP readings. A 1:10 dilution may be made according to the following procedure:

1. 50 ul of sample is taken from the Tedlar bag in a 500 ul syringe.
2. using the same syringe, 450 ul of Ultra Zero (UZ) air is added
3. 5 minutes is allowed for equilibration
4. 400 ul of sample is expelled, leaving 100 ul of sample for injection

PGC Operation

The carrier gas for the PGC is UZ air (certified as having total hydrocarbons as $\text{CH}_4 < 0.1$ ppm). This is conducted through a Cpsil 5CB wall-coated capillary column separated into a 1 meter precolumn and 9 meter analytical column. Flow rates are set at between 5 and 15 ml/min to achieve the best compromise between peak separation, and analytical run time. Operating temperature is set at 40°C and controlled by the isothermal oven.

The PGC contains a built-in integrator and four libraries enabling a chromatogram to be interpreted qualitatively and quantitatively when compared to known concentration of standards.

Calibration

As a calibrant, a mixture containing 1 ppm or thereabouts of each of the above mentioned compounds is required in a balance of UZ air. Examination of retention time tabulations (see attached table) indicates that all the target compounds can be incorporated into a single standard. A commercially certified mixture is available (blended to within $\pm 10\%$ of requested concentration, and certified to be within $\pm 2\%$ of the actual concentration specified by the manufacturer). An alternative is preparation of a standard by the operator from dilutions of headspace above samples of pure product. This technique can be used for all the analytes of interest with the exception of chloromethane.

A 50 ul injection of the standard at an appropriate instrument gain will be made after every eight sample as a calibration check. These continuous calibrations should be within 30% of the original standard or else the standard and samples analyzed since the last check standard will be reanalyzed.

The isothermal oven in the PGC effectively eliminates most of the retention time drift problems associated with ambient temperature fluctuations. If continuous calibrations are outside the reproducibility window it is usually because of partial injection syringe blockage. Precautionary measures to avoid this problem consist of regular needle cleaning, and injection of ambient air into a vial of water to check for regular syringe flow.

PGC Sensitivity

A quantitative estimate of the detection range for each analyte is not possible until the standards are obtained and PGC experimentation is performed. However, previous experience with the PGC would indicate that minimum detection limits will probably be around 100 ppb or better.

QA/QC

Lab Blanks

Blanks of UZ air will be run at appropriate gain settings at the beginning of each day to check for syringe and/or column contamination, and after any particularly heavily contaminated samples.

Field Blanks

A field blank of UZ air in a Tedlar bag will be prepared daily and accompany the soil gas samples throughout the sampling effort. Each field blank will be analyzed at the same time as the samples. This will act as a check on contamination by diffusion.

Background Air Samples

Background air samples will be taken on-site periodically to assess whether ambient air may be contributing to sample readings. This is unlikely since the rubber stoppers on the soil gas sampling rods prevent the infiltration of ambient air into the sampling system.

Background Soil Gas Samples

An area on- or off-site will be designated as non-contaminated and samples from this location will provide a baseline for examination of results from the areas of investigation.

Duplicates

A duplicate soil gas sample will be collected at every tenth sample and analyzed for information on variation of soil vapor composition at the sampling location. A duplicate injection of the same sample on the PGC will be made for every ten samples analyzed, and 15% reproducibility is anticipated.

Sampling Bag Integrity

The Tedlar bags are regularly leak tested by filling them to capacity with UZ air and if any deflation occurs, they are discarded. Tedlar bags are also evacuated, filled once with ambient air, evacuated, filled with UZ air, and reevacuated before any reuse. This million-fold dilution ensures negligible carry-over, though any bags containing grossly contaminated samples are simply discarded.

Documentation

Field notes will be maintained by assigned personnel. A printout of the PGC analyses will be retained. This record will include the date and time of analysis, PGC setup conditions, retention times and concentrations of calibrant compounds, sample identification number, and listing of detected compounds.

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VULCAN MATERIALS COMPANY
WICHITA, KANSAS

TABLE B-1

PHYSICAL PROPERTIES AND RETENTION
TIMES FOR SELECTED COMPOUNDS

	<u>COMPOUND</u>	<u>SYNONYM</u>	<u>FORMULA</u>	<u>BP(oC)</u>	<u>I.P.(eV)</u>	<u>VAPOR P (mmHg)</u>	<u>RETENTION TIMES</u>	
							<u>relative 5ml/40 oC</u>	<u>seconds 13ml/40 oC</u>
B-5	chloromethane	methyl chloride	CH ₃ Cl	-12	11.28	4.8 atm	v fast	
	dichloromethane	methylene chloride	CH ₂ Cl ₂	104	11.35	350	0.539	25.3
	2-butanone	methyl ethyl ketone	CH ₃ COCH ₂ CH ₃	175	9.53	70		33.2
	trichloromethane	chloroform	CHCl ₃	142	11.37	160	0.742	
	1,1,1-trichloroethane	methyl chloroform	CH ₃ CCl ₃	165	11.25	100	0.959	
	benzene		C ₆ H ₆	176	9.25	75	1	48.5
	tetrachloromethane	carbon tetrachloride	CCl ₄	170	11.28	91	1.048	
	trichloroethene	trichloroethylene	CHClCCl ₂	188	9.45	58	1.342	63.7
	methyl benzene	toluene	C ₆ H ₅ CH ₃	231	8.82	22	2.358	100.9
	tetrachloroethene	perchloroethylene	CCl ₂ CCl ₂	250	9.32	14	3.314	145.2
	1,3-dimethyl-benzene	meta-xylene	C ₆ H ₅ (CH ₃) ₂	282	8.56	9	5.247	229.2
	1,4-dimethyl-benzene	para-xylene	C ₆ H ₅ (CH ₃) ₂	281	8.56	9	5.247	229.2
	1,2-dimethyl-benzene	ortho-xylene	C ₆ H ₅ (CH ₃) ₂	292	8.45	7	6.234	271.7